WHAT IS CLAIMED IS:

1. A method of removing one or more particle(s) adhered to a surface of a substrate, comprising:

arranging an energy transfer medium having a predetermined thickness under and around one or more particle(s) to be removed; and

irradiating the energy transfer medium and/or the surface of the substrate with pulsed energy, wherein the predetermined thickness of the energy transfer medium is selected so that viscous and other drag forces within the energy transfer medium are sufficient to cause the one or more particle(s) to be removed from the surface of the substrate.

2. The method of claim 1, wherein the predetermined thickness of the energy transfer medium is greater than or equal to a radius of at least one of the one or more particle(s) to be removed.

3. The method of claim 1, wherein the one or more particle(s) comprise a plurality of particle(s) and the predetermined thickness of the energy transfer medium is greater than or equal to a radius of a largest of the particle(s) to be removed.

4. The method of claim 1, wherein the predetermined thickness of the energy transfer medium is greater than or equal to a radius of the one or more particle(s) to be

removed and smaller than a maximum thickness at which insufficient pulsed energy is imparted to the energy transfer medium and/or surface of the substrate to remove the energy transfer medium from the substrate.

5 The method of claim 1, wherein the predetermined thickness of the energy transfer medium is selected so that the viscous and other drag forces in the energy transfer medium are sufficient to drag the one or more particle(s) from the surface of the substrate after the particle adhesion energy has been overcome by one of explosive evaporation of the energy transfer medium, particle expansion, and/or substrate expansion caused by the pulsed energy.

6. The method of claim 5, wherein the predetermined thickness of the energy transfer medium is selected so that the viscous and other drag forces in the energy transfer medium are sufficient to drag the one or more particle(s) from the surface of the substrate after the particle adhesion energy has been overcome by explosive evaporation of the energy transfer medium caused by the pulsed energy.

7. The method of claim 5, wherein the predetermined thickness of the energy transfer medium is selected so that the viscous and other drag forces in the energy transfer medium are sufficient to drag the one or more particle(s) from the surface of the substrate after the particle adhesion energy has been overcome by particle expansion caused by the pulsed energy.

8. The method of claim 5, wherein the predetermined thickness of the energy transfer medium is selected so that the viscous and other drag forces in the energy transfer medium are sufficient to drag the one or more particle(s) from the surface of the substrate after the particle adhesion energy has been overcome by substrate expansion caused by the pulsed energy.

9. The method of claim 1, wherein the energy transfer medium is transparent.

10. The method of claim 1, wherein the energy transfer medium is a liquid.

11. The method of claim 1, wherein the energy transfer medium is alcohol.

12. The method of claim 1, wherein the substrate is an absorbing substrate.

13. The method of claim 1, wherein an irradiation geometry is selected to maximize energy transferred to the energy transfer medium and minimize substrate damage.

14. A method of removing one or more particle(s) adhered to a surface of a substrate, comprising:

arranging an energy transfer medium having a predetermined thickness under and around one or more particle(s) to be removed; and

irradiating the energy transfer medium and/or the surface of the substrate with pulsed energy, wherein the predetermined thickness of the energy transfer medium is selected so that viscous and other drag forces within the energy transfer medium are sufficient to drag the one or more particle(s) from the surface of the substrate.

15. A method of removing one or more particle(s) adhered to a surface of a substrate, comprising:

interposing an energy transfer medium having a predetermined thickness about one or more particle(s) to be removed; and

absorbing a pulsed energy into the energy transfer medium and/or the surface of the substrate, wherein the predetermined thickness of the energy transfer medium is selected so that viscous and other drag forces within the energy transfer medium are sufficient to cause the one or more particle(s) to be removed from the surface of the substrate.

16. The method of claim 15, wherein the one or more particle(s) comprise a plurality of particle(s) and the predetermined thickness of the energy transfer medium is greater than or equal to a radius of a largest of the particle(s) to be removed.

17. A method of selectively removing particle(s) adhered to a surface of a substrate with an effective radius smaller than a predetermined value, the method comprising:

arranging an energy transfer medium having a predetermined thickness under and around one or more particle(s) to be removed; and

irradiating the energy transfer medium and/or the surface of the substrate with pulsed energy, wherein irradiating the energy transfer medium and/or the surface of the substrate with pulsed energy comprises irradiating the energy transfer medium and/or the surface of the substrate with pulsed energy to remove all particles(s) with an effective radius smaller than a predetermined value.

18. The method of claim 16, further comprising determining the radius of the smallest particles(s) to be removed.

19. The method of claim 16, wherein the predetermined thickness of the energy transfer medium is selected so that viscous and other drag forces within the energy transfer medium are sufficient to cause the one or more particle(s) to be removed from the surface of the substrate.

20. The method of claim 16, wherein the predetermined thickness of the energy transfer medium is greater than or equal to a radius of the smallest of the particle(s) to be removed.

21. Apparatus for removing one or more particle(s) from a surface of a substrate, comprising:

a tailored energy transfer medium application unit configured to control application of an energy transfer medium onto the surface of a substrate; and

a tailored energy source that irradiates the energy transfer medium and/or the substrate with a tailored energy pulse or pulses, wherein the energy transfer medium application unit controls application of the energy transfer medium in accordance with a dimension of at least one of the particle(s).

22. The apparatus of claim 21, wherein the energy transfer medium application unit controls application of the energy transfer medium in accordance with a dimension of at least one of the one or more particle(s).